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Response of Soybean Cultivars to Postemergence Herbicides

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RESPONSE OF SOYBEAN CULTIVARS TO POSTEMERGENCE HERBICIDES

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The acreage of soybeans treated with postemergence herbicides for broadleaf weed control has increased over the past few years. This trend has occurred because of inconsistent control of cocklebur (Xanthium pensylvanicum Wallr), giant ragweed (Ambrosia trifida L.), jimsonweed (Datura stramonium L), and morningglory (Ipomoea hederacea (L.) Jacq. and Ipomoea purpurea (L.) Roth) with soil applied herbicides.

Basagran (bentazon) provides excellent control of cocklebur, jimsonweed, and giant ragweed and fair control of morningglory species. Blazer (acifluorfen) provides excellent control of jimsonweed, giant ragweed, and morningglory species and fair control of cocklebur. Since many soybean fields in Kentucky contain both cocklebur and morningglory, there has been much interest in adding Butyrac 200 (2,4-DB) to either Basagran or Blazer to increase the control of morningglory or cocklebur. Previous research by the University of Kentucky Weed Science group has shown that this addition of 2,4-DB will provide increased weed control, particularly on larger weeds.

These troublesome weed species should be removed prior to the fifth or sixth week of soybean growth to prevent yield reductions. Early season (first 4 to 6 weeks) applications of Butyrac 200, either alone or in combination with Basagran or Blazer, will often cause soybean injury. This injury usually is in the form of twisting, cupping, or drooping of the uppermost trifoliates at time of application.

An experiment was established to determine if this early season injury caused by Butyrac 200, either alone or in combination with Basagran or Blazer, would result in yield decreases to five soybean cultivars commonly grown in Kentucky.

Materials and Methods - A field experiment was established on a Crider silt loam soil at the West Kentucky Research and Education Center. The soil had a pH of 6.6 and contained 1.7% organic matter. Soybeans were planted on June 12, 1981 and herbicides applied on July 7. The plot area did not contain any of the weed species listed previously. The major emphasis of the research reported was on potential yield decrease.

Soybeans evaluated were the Group III cultivar, 'Williams'; the Group IV cultivar 'Union' and 'Mitchell'; and the Group V cultivars 'Essex' and 'Forrest'. These were chosen because of their popularity with Kentucky soybean producers.

Herbicides evaluated were Basagran, Blazer and Butyrac 200 applied alone or in combination to soybeans that were at the V5 stage of growth. All herbicides were applied in 26 gallons of water per acre and initial crop injury evaluated 8 days after application. Plots were harvested for yield when the different cultivars matured.

Results and Discussion - Butyrac 200 caused significantly more injury than did Basagran or Blazer. (Table 1) The addition of either 2 or 4 oz of Butyrac 200 to Basagran or Blazer resulted in increased soybean phytotoxicity. This was true for all cultivars evaluated.

The cultivar 'Williams' was injured less by single applications of Basagran, Blazer or Butyrac 200. However, the amount of crop injury was not statistically significant. With all cultivars, the addition of Butyrac 200 caused an increase in crop injury of approximately 10 to 20%. Generally, the 4 oz rate of Butyrac 200 caused more injury than did the 2 oz rate.

Injury symptoms caused by 2,4-DB were twisting and cupping of the uppermost trifoliates. Basagran and Blazer injury symptoms included leaf chlorosis and subsequent leaf necrosis. Although these injury symptoms were noted on all cultivars, with all herbicide rates, they were not severe enough to decrease soybean yield below that of a cultivated weed free treatment.

Results from this experiment indicated that the addition of Butyrac 200, at either 2 or 4 oz, to Basagran or Blazer did increase soybean phytotoxicity. However, this injury was not severe enough to cause a reduction in soybean yield. Applications of herbicide combinations, such as those used in this experiment, did not reduce yields when applied early in the growing season during soybean vegetative growth. Applications later in the year during the reproductive (flowering) and maturation (pod fill) stages could result in yield decrease.

Table 1. Soybean yield and injury from postemergence herbicide applications.

Herbicide Treatment	Amount per acre	CULTIVAR									
		WILLIAMS		UNION		MITCHELL		ESSEX		FORREST[b]	
		CRIN[a]	YLD	CRIN	YLD	CRIN	YLD	CRIN	YLD	CRIN	YLD
		%	BU/A	%	BU/A	%	BU/A	%	BU/A	%	BU/A
1. Basagran + oil concentrate	1.5 pt 1.0 qt	0	57	10	58	13	53	7	56	10	41
2. Blazer	1.0 qt	0	58	3	60	10	56	10	53	10	43
3. Butyrac 200	2.0 oz	10	57	23	50	27	47	17	56	27	41
4. Butyrac 200	4.0 oz	23	49	30	51	37	56	23	52	37	42
5. Basagran + Butyrac 200	1.5 pt 2.0 oz	17	54	20	60	20	53	17	61	23	42
6. Basagran + Butyrac 200	1.5 pt 4.0 oz	10	53	27	55	27	51	27	57	33	41
7. Blazer + Butyrac 200	1.0 qt 2.0 oz	23	62	30	56	30	52	27	59	33	43
8. Blazer + Butyrac 200	1.0 qt 4.0 oz	30	53	40	55	43	49	37	53	37	44
9. Cultivated Check	---	0	52	0	53	0	50	0	51	0	41
	LSD(.05)	7	NS	10	NS	10	NS	10	NS	11	NS

a. Crop injury based on a 0 to 100 scale with 0 equal to no crop injury and 100 being plant death.

b. Yields were reduced by freezing temperatures prior to soybean maturity.